"Ophthalmology, Ancient and Modern."

ANNUAL ADDRESS

BEFORE THE

Maine Medical Association,

JUNE 22, 1881,

BY JAMES A. SPALDING, M. D.,
PORTLAND, MAINE,
MEMBER OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY.

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ADDRESS.

The oldest specialty in medicine, if we can believe the ancient papyrus rolls of Egypt, is ophthalmology, or the knowledge of the eye in health and disease. And what can be more natural than that the sandy countries of the world, of which Egypt is typical, should be the first in which this specialty should flourish! When the dust blows through our own streets on hot summer days, it is almost impossible to shield our eyes from the irritating particles with which the air is filled. If we multiply one such day in our climate, by months in a torrid, sandy land like Egypt, it is easy, even at this distance, to imagine that the eyes of its people might be visited with inflammatory diseases, which would spread far and wide, and become chronic, amidst an ill-fed and over-crowded population.

Our supposition finds curious proof in the pages of ancient historians, who tell us that the prevalence of diseases of the eye amongst the Egyptians led their physicians, as early as 1000 B. C., to pay special attention to ophthalmology. All Egyptian oculists* as well as physicians, were priests, who were empowered to practice, not only because they had the necessary time to devote to their profession, but because the Kings desired to strengthen the position of the priests, in medicine as in religion, by making them more complete mediators between the people and the Gods. When-

* We shall use, throughout this paper, the straightforward word "oculist," in preference to the euphemistic phrase "ophthalmological surgeon."

ever a patient desired treatment for an affection of the eyes, he would summon from the nearest temple an oculist, who would suggest such remedies as were mentioned in the Laws collated from the writings of the oldest medical authorities. If the oculist overstepped these laws, that is to say, if he neglected to follow them implicitly, or suggested treatment which they did not mention, and harm ensued to vision, he became liable according to the damage inflicted.

The Egyptian oculist received no honorarium from the patient, for his salary was paid by the Crown. But he would often suggest that rich patients should give some present to the temple in which he lived, in order to expedite the cure. As the oculist was thus independent of the amount of money that he made, quackery was unknown. But, on the other hand, only few advances could be made, owing to the narrow bounds within which his practical activity was confined by these rigid laws of medicine. In due season, the fame of some of these Egyptian oculists spread all over the known world, and we read of one who was sent for to cure the eyes of the mother of Cyrus the Persian.

The treatment of diseases of the eye, at this early era, was purely empirical, consisting in the administration or application of nauseating or irritating drugs, and the performance of religious ceremonies. Sleep in the temple of Isis was considered very beneficial. The priests would, on the following morning, inquire the dreams of the patient, and seek therein to read the treatment as oracled by the goddess.

We may here cite one pathological opinion of the Egyptians. Cataract was regarded as a fluid formed outside the eye, and then driven into the eye by heat. If this fluid entered the eye from the surface blood-vessels, the cataract was curable; if it previously traversed the brain, the cataract was incurable. Strange as we may deem it, the Egyptians had no idea that the crystalline lens was the seat of cataract. To them, the lens was simply the organ of vision. But, when we learn that cataract was wholly unrecognized as a disease of the lens till the eighteenth century, our respect for the knowledge of the Egyptians increases, for they knew as much about cataract 1000 B. C., as was known 1700 A. D.

The historians of India also mention oculists who described seventy diseases of the eye; amongst others, the purulent ophthalmia of infants, which they treated nearly as we do now-a-days. Of the anatomy of the eye, the Indian oculists knew but little.

The earlier Grecian oculists were very ignorant, and made but few advances beyond Egyptian and Hindoo practice. According to their views, all diseases were due to catarrh. Diseases of the eye were ascribed to the too frequent use of vegetables; strabismus was an hereditary affection, and scotoma was a rarification of the small vessels which conduct the purest fluid to the pupil, the latter being regarded as the medium of vision. The chief remedies were crocus, ebony, poppy-juice, copper and zinc. The patients were advised to wear an emerald, and gaze at it frequently, to rest the eye. Tattooing of the cornea was practiced by the Greeks, and is not at all a modern invention, which appeared and disappeared in a short period, a few years ago. PLATO proves the existence of the specialty among the Greeks, when he says that the treatment of diseases of the eye should only be undertaken by those who have showed themselves capable, after an exhaustive study of the organ concerned. Physicians who had not thus studied should be precluded from even examining the eye.

The specialty of ophthalmology declined amongst the Romans, owing to the fact that crowds rushed to it because there was money in it, until oculists fell to the level of the barber-surgeons, as mere concocters of eye salves. We may trace the wanderings of these men over the face of Europe, by their innumerable seal-stones, now visible to the curious, in the cabinets of antiquaries. These fellows were ready for every case. If their salves and lotions were of no avail, they resorted to cupping, to the knife or to the actual cautery. They knew nothing about the eye; they simply imitated the methods of the general practitioner. CICERO warned people to have nothing to do with oculists, but to consult a regular practitioner. GALEN had long before demanded that these purse-cutters should be prohibited from practicing, but at the same time he recommended the treatment of his contemporary, JUSTUS, an oculist, who pretended, *e. g.*, to cure corneal abscess by shaking

the patient's head with all his might, until the abscess burst and its contents escaped.

The Roman oculist may be dismissed with this biting epigram of MARCELLUS: "Now you are a gladiator, once you were an oculist; you used then to treat your patients as roughly as you now treat the wild beasts in the arena."

We must, however, note a few advances in ophthalmology as made by the Roman practitioner. Thus GALEN, who studied the eyes of horses and other animals, and treated diseases of the eye, discovered the tear passages: mydriatics were employed in a semi-rational manner, considerable attention was paid to operations on the eyelids, and a more careful treatment of catarrhal inflammation prevailed.

In the Dark Ages, ophthalmology fell lower and lower. The treatment of cataract, for example, was brutal. Inasmuch as the Egyptian pathology of this disease still prevailed, there were two aims in view in a case of cataract: first, to prevent the imaginary fluid from entering the eye, and, second, to prevent its coagulation when once present. In the first case, the cure was by periscythismus, or the making of a deep incision across the forehead from temple to temple, down through the periosteum, and keeping the wound open with charpie saturated with oil and wine. After three days, the bone was scraped, and the wound left to heal. Another operation, for the same purpose, was hypospathismus, which consisted in making three vertical incisions, an inch apart, upon the forehead, incising the periosteum and denuding the bone.

When the fluid had entered the eye and was supposed to be coagulating, incisions were made over the cranium, from ear to ear, and from the root of the nose to the occiput, then the periosteum was opened and the cautery applied until the bone exfoliated. These operations were not only actually performed for the cure of cataract, but were even employed as a prophylactic in the case of mere infants!

It is easy, from another point of view, to see why quackery flourished. People preferred to buy useless salves, or even to go blind for life, rather than undergo the torture of these operations, and even then be unrelieved. Amongst the simpler cures for

cataract, was the use of lotions. In order, however, to be efficacious, they must be held directly against the eyelids for weeks or months. A glass shell was made to fit around the orbit, and was held in position by bandages. The lotion, composed, for instance, of equal parts of the gall-bladder of the crane, lizard, goat, falcon, eagle and raven, made into pills and dissolved in fennel water, was introduced through a small hole in the shell and changed every day.

Before dismissing the subject of periscythismus, we should note that HIPPOCRATES says, when one loses his vision, but his eyes remain sound, the forehead should be incised, the skin dissected up, the bones sawed open and the fluid evacuated; vision will then be restored. This passage was laughed at until 1876, when a man, who had suffered for years with cerebral symptoms and loss of vision, was cured by trephining this district and evacuating the pus.

The Arabs of this era had many oculists, who, without making much progress in ophthalmology, published innumerable text books on the subject, most of which, however, are mere compilations from the ancients. They invented the operation for the cure of soft cataract by suction, and improved the treatment of pannus. No one could practice as an oculist in Arabia, unless he were ambidextrous. This dogma held sway until STEVENSON, in our era, dared to overthrow it by operating only with the right hand.

Ophthalmology, till the middle of the seventeenth century, continued chiefly in the hands of arrant quacks. The darkest superstition reigned over the whole field of the treatment of diseases of the eye. Even the few reformers wandered amidst mysticism and superstition. Strabismus was due to the mother of the child having looked at a dying man during her pregnancy; purulent discharge from the eyes was attributed to melancholy; onions were recommended to hasten the growth of cataract, which could only be couched under certain conjunctions of the planets, or, as the ancient verse runs:

"Couch cataracts upon a day so fair
That neither wind nor clouds disturb the air;
When Spring with dimples fills the earth's rich lap
Or Autumn makes the tree put off its cap.
The Moon at full, or in conjunction fly,
Or tracing Aries, or in the Gemini."

Typical of the better class of oculists of the sixteenth and seventeenth centuries, is GEORG BARTISCH, who printed, in 1583, a voluminous hand-book on diseases of the eye, the first one in the German language. This rare work begins with fifty or more pages of certificates of cure; "how, under God's will and the skill of GEORG BARTISCH, the eyes of so-and-so were cured"; or how, for example, "GEORG HOCK's daughter Anne, was afflicted for six years with magic, as well as with painful and thick discharges from her eyes, and was blind, but this oculist helped her"; and witnessed by the Mayor or Burgomaster of the town. Following these, we find long and devout prayers for the blind, as well as prayers to heaven to assist the hands of this especial oculist, whose portrait is here displayed.

Nowhere can we get a better idea of what oculists then were than from what BARTISCH next claims they should be. Every oculist, in his opinion, should have been brought up by a God-fearing father and mother, and should be an honest and God-fearing man himself; he should attend church and listen to the sermon; he should be a married man, and sober in every respect; he should have studied Latin and the anatomy of the body, *especially that of the eye* (note that!), and understand the various humors of man. He should not be one whose only manual practice has been at the plow and dung-cart. Moreover, he should be ambidextrous, lest he have to operate upon the patient's eyes from behind and so occasion blindness; he should practice frequently upon the lute and harp; he should not be too eager for money; he should not be a drunkard, nor a liar, nor dirty in his outward appearance. Finally, let him tell the truth, the possible as well as the impossible.

Proceeding further along in this text book, we find queer descriptions of diseases of the eye, odd engravings of operations, and of the masks used in strabismus, causing the patient to look for months in a direction opposite to the deviation of the squinting eye. Here we read of "a glorious salve for narrow eyes," composed of twenty different substances, and there, of blue lotions for blue cataracts, and green lotions for green cataracts. Anon, we drop upon such quaint advice as this: "On the morning of performing

an operation on the eyes, let the patient bathe his feet in lukewarm water to draw the noxious juices from his head, and then clap a plaster on his head to keep the juices from returning." For finale, we quote this curiosity in the way of pathology: "Some people say that starr (cataract) is due to eating too freely of a bird called the starr, or drinking water in which this bird has bathed." But this, we are gravely assured, is foolish superstition. "On the contrary, I say that cataract is a tenacious and slimy fluid, which collects in the brain and blood, and then passes forward between the tunics of the eye. Its causes are the sins of men, or as an example of patience to others. The other causes I leave to theologians to point out or discuss." BARTISCH, in this work, which deserves even further mention than we have given it, is nothing if not conservative; he worships Galen and God. BARTISCH was a renowned operator, and deserves mention, finally, as the first to suggest and perform enucleation of the eye.

We have before us another odd book, from which we quote, to show the state of ophthalmology in England. It is by BANNISTER (who rests to his reader, ready to be found at Stamford), who is not only oculist, aurist, cutter-for-stone, and curer of hare-lip and wry neck, but a very humorous versifier. Thus does he delineate the quacks of his day, A. D. 1621:

> "Yet they that hardly teeth can draw,
> Unless they spill much blood or break the jaw,
> Will deal with eyes and boast of famous facts*
> They have performed in couching cataracts."

BANNISTER complains of women as oculists; "having snatched up one or two medicines, they practice on the eye. Many have come to me from these, lighted more by sorrow than light, with their eyes full of tears, but empty of optic humors. Can their copperas, or alum, or unguent of Christopher cure all diseases of the eye?" He is horrified that women should lick sore eyes with their tongues (a common procedure even in our own days). He protests against the practice of putting a louse into an eye which is dry, to tickle the eye and make the tears moisten it. Likewise does he deprecate the application to the eyes of roasted crabs or

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*Things done: operations.

oil of snails. BANNISTER's own knowledge, however, is not extreme. We have just seen his rhyming advice as to the time for couching cataracts, and we also find him advising blind people to have their eyes breathed upon by a child with a clean mouth, after having chewed anise root. The chief remedies used by this oculist were alum, copper, and pearls freshly ground and mixed with the white of eggs. He foresees modern practice, by urging the danger of poultices in cases of ulceration of the cornea.

Sixty years later, no great advances had been made in English opthalmology, for PEPYS tell us that he consulted the celebrated oculist TURBERVILLE, and adds: "I did see several eyes examined anatomically, and Dr. T. told me that, up to this time, he had never dissected an eye. Strange that this man should be so great an oculist, and yet—had seen no eyes dissected."

We may truly say that, between the twelfth and eighteenth centuries, most of the advances in ophthalmology were made by men who were not specialists. Thus, for one example, spectacles were discovered by a monk, and brought into use by monks in spite of the opposition of the oculists. BARTISCH, for instance, decries the use of glasses: "It is better to have two eyes than four," is his sententious remark. "If any one has become used to glasses, and will be rid of them, let him purge, and then use my confections for weak eyes."

Many surgeons in this epoch operated upon the eyes of animals, but dreaded to operate upon human eyes, because the operations were considered so supremely delicate that no one but an oculist could perform them. It is astounding to see SAVONAROLA, for instance, magnifying the difficulty of these operations, and FABRICIUS assuring his readers that, if they looked too closely into an eye on which they were operating, they were very likely, in trying to relieve the blind, to go blind themselves. Here, again, in the hesitation of such skillful men, do we see why quackery flourished. Indeed, so audacious did the traveling oculists now become, that they threatened to maim any surgeon who should dare to operate upon the eye. Awed by this threat, surgeons now paid great attention to the *medical* treatment of diseases of the eye. Patients were dieted and medicated, and ordered to live in the sunshine, to

bathe frequently in wine, to avoid flesh-meat and vegetables, and to take a great deal of exercise. Overmuch wine and cold winds, exposure to heat, too much pepper, too hard work, too many vegetables, were bad for the eyes, but worst of all was sitting up late at night, or passing the night in watching. Anticipating dates by a century, we will finish this topic by saying that electricity also came into vogue, but soon proved as useless as it has within the last year or so in our own days.

We will now try to depict a traveling oculist of the fifteenth century, whom we define as a disreputable tramp, carrying on his trade at fairs, operating and selling his wares under the open sky. As all oculists were then supposed to receive the best education in the East, our hero would hail from Constantinople, for example, and, under the name of Jacomo the Great, would enter a town, followed by the blind whom he had picked up along the road. As the story goes, some one once asked one of these quacks why he had these blind men following him. "Oh, for an example; for if they had only used this precious eye salve of mine they would never have become blind." A scaffolding was set up, covered with gorgeous rugs, while around were distributed pots of salve, rolls of plaster, poultices, apparatus for conjurations, and amulets to exorcise witchcraft.*

At proper intervals, stood tables covered with tongs, hammers, uncouth scissors, enormous knives and saws; all made more to create astonishment than to be used in operations on the eye. Some of these scissors were ten inches long, and "cataract needles big enough to kill a calf or sew a pair of shoes." At the foot of the steps leading to the scaffold, stood a clown, who amused the by-standers with jokes, or attracted passers-by by repeated blasts of a trumpet. Sometimes he acted as assistant, but only to steady the arms of the operator. But this position becomes important, when we recollect that oculists insisted that the couching

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* In this last point, the quacks followed popular superstition. Even our often quoted Bartisch gives a chapter to the diseases of the eye due to witchcraft, in which he recognizes hot witchcraft as well as cold, shows us a picture of enormous sclerotic staphyloma, which he says represents the eyes turned into pears, and recommends prayer as the suitable cure.

needle should be held steadily in the eye for fifteen minutes (or so long as it takes to say three *pater nosters* and one *miserere*, or five *ave marias*) in order to keep the lens in its new position in the vitreous. During minor operations, the clown tried to relieve the patient's sufferings by puns and grimaces.

All being ready, the oculist would march silently to and fro, exhibiting his flowing robes and jeweled fingers. Anon, he would advance to the front and speak of his wondrous cures with unblushing audacity and fervid eloquence. When patients came, he would spout after this nonsensical fashion:

> "One asks the patient, if the spermick state,
> Or optic sinews terragrophicate;
> Another says: 'Th' exulcerated light
> Is quite contingerated from the sight.'"

Some oculists operated fairly well, but wasted their goods in luxury, instead of studying their art and buying new instruments. The gentry were often invited to look on at the operations. All classes were treated alike; the one thing demanded was hard cash. After the operation, the eye was pasted over with the white of an egg. Over that was poured a lotion of alum or copper (the latter sold at enormous prices as Celestial Eye Water), the eye bandaged and the patient ordered to sit behind a stove for two days. If pain ensued, the patient was directed to take a young stork which had never stood upon the ground, put him in an unglazed pot and burn him to powder; then mix the powder with white of eggs and apply frequently to the eyes. Elsewhere we learn, "that the oculists take the people and operate on their eyes for cataract in the open market place, in the wind and open air, before anyone who chooses to look on, and then let them go, like an old sow from her feeding trough." Thus was the patient left to chance. Even the rich fared no better; the oculist came, looked, took his fee and left. We are not to think that quacks grew rich, although they earned more from salves and lotions than from operations. Half a thaler was the fee for couching cataracts. Bannister exclaims: "These firebrands, that choke and smoke folk's eyes out, can take hens, chickens and such reasonable rewards for their unreasonable deeds." And Bartisch says: "The usual price for a common eye-water is one thaler; for the more precious sort, ten to twenty

thalers, and sometimes two hundred or three hundred; all for no benefit." Occasionally, the quack would gain the friendship of some petty Prince, and thus obtain great social and pecuniary advantages, to say nothing of letters of introduction and letters patent as oculist. On the other hand, he was liable to brutal treatment at the hands of those whom he had failed to cure. The Gothic laws excused anyone who retaliated upon oculists who neglected their patients after an operation. Among historical anecdotes of this nature, we read of King Johann, of Bohemia, who caused an oculist to be hurled into the river Oder, because he failed in an operation to restore that monarch's sight.

In the seventeenth century, the authorities began to open their eyes to the frauds practiced by the oculists. And, as we see by the Prussian laws of 1685, "Whenever oculists, cutters-for-stone, reducers of hernia and tooth-pullers, choose their trade and will practice it publicly, they shall appear before a magistrate, as well as before the authorities of the medical school, and submit their wares, as well as their persons, to inspection."

This determination of the authorities to suppress quackery, and the interest caused by the wonderful discoveries in optics by Kepler,* Scheiner and Newton, led skillful surgeons to the study of the eye. Foremost of these, and the first to give lectures and hold cliniques in ophthalmology, was Boerhave at Utrecht. Richter, also, is to be mentioned for having brought ophthalmology into closer relations with general medicine, and shown that diseases

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* What would be the thoughts of noble Kepler, could he now return to the world and see the general practitioners and specialists who make so much money out of their profession, without ever discovering anything by which the world is made richer? Or what would he say to those who have but little practice and so fall into quackery, or who live honestly but grumblingly, in spite of what they call gnawing poverty. Think of Kepler going sixty times over his calculations on the heavenly stars, or working out, in equal patience, his ideas of vision and the laws of light, writing almanacs for his bread and water, and having nothing certain for a livelihood except his $90 pension (*which they wouldn't pay him*) and a strong soul! And, as we may say, starving to death, warding it off, as well as he could, by exhibiting the wonderful camera-obscura just discovered by Porta, at Naples.

of the eye often depended on bodily diseases, and hence demanded general as well as local treatment.

Amongst the numerous advances made at this time, we have to note that the conjunctiva was proved to be something else than a mere continuation of the pericranium of the orbit, and that the meibomian glands were discovered. FALLOPIA examined the cornea and ciliary body; MARIOTTE demonstrated the blind spot; KEPLER studied the acommodation of the eye and the laws of binocular vision; SCHEINER calculated the refraction of the media of the eye; while PARÉ invented a speculum, and suggested the use of artificial eyes of gold and silver, instead of the pictures of an eye painted on leather, and held over the empty orbit or mutilated eyeball, by a strap about the forehead, as had always been the fashion.

But most wonderful of all was the discovery, by BRISSEAU and MAITRE-JEAN, that cataract was not a film in front of the crystalline lens, but the opaque lens itself. GALEN had known that the lens became opaque, but he had never connected this condition with cataract. The same error prevailed until about the year 1700. FABRIZIO, alone, suggested that cataract lay close behind the pupil, and that in couching cataracts we should take great care not to wound the lens. This, however, was nothing more than a close guess at the truth. In 1656, an opaque lens was found in an eye which had been couched for cataract. But it was not until 1705, that BRISSEAU claimed (on anatomical grounds alone) that the lens must be the seat of cataract. The responsive uproar in the ophthalmological world silenced BRISSEAU, until the more gifted MAITRE-JEAN could advance to his support.

While couching a cataract twenty years before, MAITRE-JEAN saw ~~the cataract~~ it escape from his needle and slip into the anterior chamber. He examined it *in situ*, and to his amazement saw that the cataract was not a film, but a double-convex body, just like the lens. In subsequent years, he made a few similar observations. In 1692, he proved, at a post-mortem examination, that the cataract and the opaque crystalline lens were one and the same thing. He kept silence for years, and not until 1707, two years after BRISSEAU'S memorial, read before the academy, did he publish in his text-book (delightful reading, even in our own days; clear and

sagacious everywhere) his new discovery, based on anatomical and pathological grounds combined, that, under all circumstances, cataract is simply an opacity of the lens.

The scientific world went fairly mad over this unanswerable argument in favor of BRISSEAU'S idea. We can only show the spirit of the age by the following anecdote: A blind surgeon, BOURDELOT by name, an exasperatingly earnest defender of the old school, would not have his cataracts couched, made no attempt to recover his sight, but, in his will, ordered his eyes to be examined after death, to see if his cataracts really were the opaque crystalline lenses, as BRISSEAU and MAITRE-JEAN had declared. Examination after death showed that the lenses in BOURDELOT'S eyes were opaque, and did more to gain believers and supporters for the new theory than all previous writings. Thirty years, however, had to elapse, ere the old ideas were completely swept away into the rubbish heap of the past.

The chief effect of MAITRE-JEAN'S discovery was to suggest the idea that a cataract could now be extracted from the eye, rather than couched into another part of the eye, where it often acted as a foreign body, destroyed the recovered vision, and even endangered that of the other eye.

Extraction of cataract has been claimed for the ancients, but a careful examination of their writings shows no confirmation of this claim, which has been based on erroneous translations and mistaken views of their pathology. We may safely say that DAVIEL, in the eighteenth century, was the first to prove, in public, that a cataract could be extracted from its normal seat in the eye. In accounting for so long a delay in the discovery of what seems so natural and so simple an operation as cataract extraction, we must remember that GALEN said, "Injuries of the cornea allow the aqueous to escape, so that the vision is thus destroyed." For two thousand years, these words restrained all oculists from opening the cornea for any purpose whatever. Moreover, the lens was always assumed to be the seat of vision; if it were removed, the eye would become hopelessly blind. The eighteenth century saw these dogmas overthrown. A few daring men ventured to extract cataracts, which had become dislocated into the anterior chamber, by acci-

dent or during the operation of depression. Others ventured, doubtfully, to extract traumatic cataracts through the cornea; but it was DAVIEL who, in 1750, first operated for the extraction of a cataract by a distinct method. DAVIEL'S merit is in having defined a precise operation, the flap operation, for the extraction of cataract. In his first report, in 1756, DAVIEL showed 305 successes in 354 operations. From that day to this, the flap operation has held its ground, although it has undergone many changes in the direction of simplicity. After a bitter fight, it won the victory over the old operation of couching, which is now but rarely heard of, except historically, and only resorted to in extremely exceptional cases.

In the second half of the eighteenth century, further advances were attained in ophthalmology by the French and followed up later by the German and English oculists. PETIT suggested the method of examining frozen eyes, which led to the discovery of PETIT'S canal, DESCEMET'S membrane, the Zone of ZINN, FONTANA'S space and the yellow spot. YOUNG advanced his theory that the seat of accommodation lay in the crystalline lens, and developed his views on the perception of color. He was also the first to explain astigmatism as a defect of vision. In the treatment of diseases of the eye, we note the careful study of mydriatics and the introduction of nitrate of silver as an astringent. Iritis was diagnosticated and treated more rationally; since the most ancient historical eras, it had been called inflammatory cataract. ANEL first catheterized the lachrymal passage. The formation of an artificial pupil, almost as great a discovery as that of DAVIEL, was introduced by the English CHESELDEN, as iridotomy, while to BEER we owe the perfection of the more finished operation of iridectomy.

The social rank of oculists now increased side by side with their advances in learning. The cultivated representatives of ophthalmology were everywhere welcomed by the general practitioners. In the latter part of the century, MARIA THERESA founded a professorship of ophthalmology, at Vienna, the first in the world; and, by the end of the century, similar professorships were endowed at many of the German and French Universities.

In spite of these advances, traveling oculists still flourished, and were even more dangerous to the people than in former ages, for they now pretended to be scientific oculists, and succeeded in deceiving even surgeons of good standing, as well as the people, as of old. Many of them rejoiced in an extensive clientage. They no longer carried on their trade on an open stage, with a clown as assistant, but, mounted on horseback and preceded by musicians, they marched valiantly along. They usually operated upon a covered stage, where were exhibited gold and silver instruments of exquisite workmanship. They excelled only in the art of advertising themselves. Their chief trade was the sale of salves and lotions at fabulous prices. All fees were demanded in advance; they refused to treat any case beyond a given time, and fled by night when the case became desperate.

The most notorious quack oculists of the eighteenth century were the Englishmen, Woolhouse and Taylor. The former we will dismiss at once, by saying that he used a secret ophthalmoxystron for the cure of conjunctivitis. After his death, this instrument was discovered to be a lot of beards of rye, made into a brush, with which he would irritate the inflamed mucous surfaces. It is interesting to note, at this point, that the Chinese barbers still use a small bamboo rod, with which they scrape the everted eyelids in cases of conjunctivitis.

John Taylor, however, is a phenomenon at whom we must look more precisely. The years 1750–1760 were loud with his fame; a distinct Taylor literature flourished. If necessary, one could collect a small library of books, pamphlets and newspaper articles with: "Taylor is a fraud," "Taylor is the saviour of mankind"—shriek following shriek, *pro* and *con*. Taylor's only real merit, so far as patient delving has enabled us to discover, is that he suggested the division of the muscles of the eye, as a cure for strabismus, but never actually performed the operation. His writings are crammed with absurdities. He claimed to be the only scientific oculist of the age; all the others, combined, were unequal to himself alone. In spite of his lack of skill, he deceived hosts of medical men into giving him letters of recommendation and sending him patients.

He had a way of persuading people whom he could not cure that their cases were hopeless; what he could not cure was incurable.

When TAYLOR had chosen a place for the public exhibition of himself, the papers, for weeks before, would be filled with notices of his approaching visit, and certificates of cures. When popular curiosity had been raised to the needful pitch, TAYLOR would enter a town in a coach which was covered with gorgeously colored pictures of the diseases of the eye, with which he was familiar. Fancy this new-fangled Argus! The newspapers would now announce his arrival, and invite all to attend "The Great TAYLOR's lecture on the form, functions and diseases of the eye." When the people were assembled, they were shown the most beautiful instruments imaginable, models of healthy and diseased eyes, charts of the shape of the eye, and medals struck in honor of wonderful cures. To the nobility, were distributed copies of TAYLOR's portrait, surrounded by various verses in Latin, one of which runs: "Behold the effigy of TAYLOR, who was sent from above to couch cataracts, restore sight, remove gutta-serena, etc."

> "Behold the man, his temples surrounded with laurel.
> Worthy is he: his fame shall for centuries last."

The literary portion of the promised lecture was simply high-flown laudation of TAYLOR, the renowned oculist.

Thus the bait was thrown for the people to bite, and then the quack proceeded to plunder their purses. First of all, he would treat cases requiring lotions or salves, then he would operate; then leave the patients to their fate. The only known test of the ability of this devouring TAYLOR is a list of fifty cataract operations at Kopenhagen, with only six successes.

In closing our account of traveling oculists, we are not to forget that some of the best oculists of the eighteenth century traveled to and fro in practicing their specialty. DAVIEL, for example, saw no harm in writing a popular book, in which he described his new operation for cataract extraction, tells of his failures and successes, and says that he is at present in Paris, where he may be consulted as an oculist. We must remember, however, that travel in the last century, even in the civilized parts of Europe, was tedious even for the rich, or for those who could amuse themselves by

gazing at nature or art. How burdensome, then, for those who were blind! Hence good oculists traveled about to get patients; but they waited till their patients were relieved or cured, or until the after-effects of an operation had disappeared. Their lives were earnest and devoted to science. When professorships of ophthalmology were established, as we have just seen, men of this stamp ceased this method of practicing their speciality; no oculist, with self-respect, indulges in such methods in our days.

The history of ophthalmology in the first half of the present century is so full of interesting data that, condense as we may, we cannot find space to mention even a tithe. First of all, we see ophthalmic hospitals established in all the larger cities, and especial journals carried on, with more or less success, in various languages. The early years of the century were loud with eager and even violent discussions on Egyptian ophthalmia, brought into Europe by the returning troops of various nations; cataract was studied with so much zeal that Velpeau catalogued sixty varieties; couching still had zealous defenders; the old method of cauterizing the occiput for the cure of cataract was temporarily revived; while electricity was extolled to the skies as a cure for cataract. Moreover, the treatment of iritis was marvelously improved; glaucoma and amaurosis were deeply and carefully studied, but without much benefit to those thus affected. Beer showed what hypopyum really was, Bonnet proposed his method of enucleating the eyeball, and Pritchard first performed the operation, in 1851, in a case of sympathetic ophthalmia. Petrequin first employed fixation of the eyeball during operations (1842); previously, pressure on the other eye was the only means employed. Himly advanced his highly original method of keratoplasty, by which the transparent cornea of an animal might be inserted into a leucomatous cornea. MacKenzie wrote his masterly English text-book, which still can teach us, and Dieffenbach first performed the modern operation for strabismus, as suggested by Stromeyer. In this era, too, we see the first traces of ophthalmology in America.

In 1851, came Helmholtz's discovery of the ophthalmoscope; one of the simplest things in the world—a round mirror with a central aperture. But this simple contrivance, in the hands of

v. JAEGER and v. GRAEFE, created a revolution in our specialty. The interior of the eye could at last be illuminated and viewed.

In the twenty years that ensued, the chief figure amongst the many skillful men who flocked to ophthalmology was ALBRECHT VON GRAEFE, MASTER in his art! Most of the celebrated oculists of our day were disciples of V. GRAÈFE. To him we owe the wonderful advances made in the diagnosis and rational treatment of amaurosis and amblyopia; the modern operation for the linear extraction of cataract, the theory and practical treatment of strabismus, and, perhaps greatest of all his discoveries, the cure of glaucoma by iridectomy. The foundation of modern ophthalmology is v. GRAEFE's handiwork.

In other directions, we may say that to BOWMAN we owe the scientific treatment of lachrymal affections; to CRAMER, the settlement of the long disputed seat of the accommodation in the lens, as advanced in the previous century by YOUNG; and to DONDERS immortal discoveries in the refractive conditions and construction of the eye.

Since v. GRAEFE's death, oculists at home and abroad—and their name is legion, so numerous, indeed, that we cannot attribute to each his share in the general improvement in the specialty—have been chiefly occupied with improvements in the ophthalmoscope; the enlargement of the materia medica by the newly discovered drugs, eserine, pilocarpine, duboisia, etc.; the diagnosis of constitutional affections from ophthalmoscopic alterations in the interior of the eye; the pathology of glaucoma, and the new operation of sclerotomy, as a substitute for iridectomy; the examination of the sense of colors; the perfection of the operation for cataract extraction; the study of sympathetic ophthalmia and the new operation of optico-ciliary neurotomy. These last ten years we may style the era of intensely practical ophthalmology, directed to the perfection of numerous details in operations and treatment. Finally, we may call this the literary era in ophthalmology, years in which practical cases and theoretical views are spread broad-cast over the entire world by the magical printing press.

Here, now, we reach the present day, and look about over our own works, which we cannot of course criticize. That remains for

those who are to come after. But we are not to stand still, lest we go backward, as the old German proverb says. We are not to pride ourselves on our abilities. We have no right to sneer at the past. Oculists in the last century made far greater advances, proportionally, than we can ever make. The great advantages of study and rapidity in communicating thought, which we enjoy, have been of incalculable benefit to us. With those same advantages, the laborers in the eighteenth century would long since have left us nothing new to discover.

We have now finished our historical examination of the various advances in ophthalmology, and we have, in conclusion, simply to call your attention to a few thoughts upon the extremely interesting topic of the mutual professional relations of the general practitioner and the specialist in diseases of the eye.

We assume, without argument, that there is a need of skillful oculists. The vast majority of the blind are helpless and useless. Few blind people have achieved greatness; their genius, alone (their capacity for patience), has won for them the victory over blindness. Fewer still are capable of earning their own bread. The proportional number of the blind is still too large, and it should be reduced, if possible. It is said that more than fifty per cent. of the cases in the blind asylums could have been relieved by proper and early attention. In thinking this subject over, it seemed to us that the chief means in this direction would be the seasonable and friendly co-operation of the practitioner and specialist, under certain aspects, upon which broad subject (deserving even the whole of our allotted time for discussion) we will at this place endeavor to throw some little light.

Let us suppose that a patient is suffering from some constitutional disease (*e. g.*, inflammation of the liver), which has seriously affected his vision. The practitioner's experience teaches him the best treatment of the general disease, and he continues it, in hope of subduing the assumed congestion in the eyes by relieving the inflammation in the organ affected. But vision still diminishes o continues poor. Let a capable specialist be called; with the ophthalmoscope, he diagnosticates, we will suppose, an optic neuritis, and advises the local use of the artificial leech, which, *without in-*

terfering with the general treatment, will probably improve vision; or, he suggests remedies which he knows to be useful, although not especially indicated for the constitutional affection. But, if the practitioner in charge of the case is as narrow-minded as he sometimes accuses the specialist of being, he will either decline this advice, or he may even refuse to suggest a consultation. He will defiantly cling to the idea that good sight and good health will gradually progress, hand in hand. At a later date, the patient, of his own accord, consults the oculist, who now finds secondary atrophy of the optic nerves; restoration of vision is hopeless; at the best, vision may remain as it is, but it will probably diminish by degrees.

In such cases as this, which are by no means uncommon, the co-operation of the physician and oculist would, in all human probability, have been of great avail to the patient, and saved him, for the rest of his life, from a condition approaching blindness. Optic neuritis has repeatedly been relieved in the manner suggested, and vision completely restored, if the case were taken in season.

We must remember that to recognize a disease is the chief aim of the physician, whether practitioner or specialist; when that is done, we have a more secure basis for our medical treatment. This greater certainty of recognizing diseases of the interior of the eye by the use of the ophthalmoscope is, perhaps, the chief means by which modern ophthalmology has reached its present scientific height, amidst all other branches of medicine. Ought it not, then, to be a duty on the part of a general practitioner, in a case of threatened loss of vision, in conjunction with some well-defined constitutional disease which he has been called upon to treat, to ask for an examination with the ophthalmoscope? If these definite changes can be recognized in the interior of the eye, the proper treatment may be begun with hopeful prognostications for the recovery of useful vision.

In a much more urgent degree may this suggestion of co-operation bear fruit in those cases of destructive ophthalmia neonatorum sometimes seen, as well as in strumous inflammation of the eyes, and generally, in a word, in all those affections of the eye in the *young*, upon which good or bad vision for life may depend, and to

which the busy practitioner cannot always give his undivided attention.

While discussing this subject of diseases of the eyes in children, we desire to offer a suggestion to this effect: Would it be overzealous in every practioner to take to the bedside of the lying-in woman a two per cent. solution of carbolic acid, or a four per cent. solution of Boracic acid, and, the moment that the child's head is born, to wash the eyelids, before they open, with either one of these antiseptics? Statistics, based on a large number of cases in the German lying-in hospitals, show that nine per cent. of the infants were affected with ophthalmia before this system was introduced, and only three per cent. afterwards. Additionally, the fact was shown that, where the eyes became thus affected, in spite of antiseptics, or from lack of care in using them, the disease always ran a milder course. If, by such means as these, we can reduce the number of cases of this disease, or render them more amenable to treatment when they do occur, we shall, of course, reduce the moderately large percentage of cases of blindness dependent entirely upon this disease, and, of course, reduce the percentage of cases of blindness from all causes.

Finally, we come to the extremely important subject of sympathetic ophthalmia, in which we are not simply concerned with the common question of saving the sight of an injured eye, but are brought face to face with this momentous question: shall this patient be blind for life, simply because the irritation has been transmitted from the injured eye to the healthy eye, while we have stood idly by, with weapons at command, and were not *sure* in what manner to use them? Rare as are the opportunities for meeting with cases of sympathetic ophthalmia, the specialist, either from his own experience or from the experience of others, which he must always have at his fingers' ends, ought to know more about this terrible affection than the general practitioner. This subject is so urgent, that we would use all the eloquence at our command to insist that every practitioner who meets with a case of severe injury to the eyeball itself, and more especially if he fears that a foreign body lies embedded in the interior of the eye, ought at once to send the patient to some trustworthy specialist.

Too much is at stake for the practitioner (to say nothing of the incompetent specialist) to trust to chance in saving the injured eye, or still less to chance, in allowing the patient to escape enucleation of the injured eye when it ought to be done; and, least of all, to chance, in advising enucleation and then seeing the patient recover better sight in the injured eye than in the one sympathetically affected, simply because he would not permit the operation to be done. The specialist, when consulted in such cases as these, may consider the probabilities or possibilities of sympathetic inflammation, and give the intelligent patient an accurate description of the premonitory symptoms, so that he may at once present himself for treatment when they appear. Or, in the case of an intelligent patient, he may urge an immediate enucleation of the injured eye. Optico-ciliary neurotomy, of which we have heard so much in later years, does not seem to have deserved the panegyrics which have been lavished upon it. In fifteen recent cases seen by a German oculist, only one preserved the desired effect for one year. In the remainder, enucleation became urgent in nine cases, and was performed with beneficial results.

Now, on the other hand, let us suppose that an oculist examines the eyes of a patient who comes directly to him for consultation, and discovers certain defects in the field of vision, or in the movements of the eyes, or in the size or variations of size in the pupils, or some peculiar form of inflammation of the retina; then he may diagnose a cerebral or spinal disturbance, or the presence of albumen, or even a Bright's disease. Under such circumstances, which might be multiplied indefinitely, as, for instance, with affections of the stomach, liver, uterus, etc., the oculist ought, without a moment's hesitation, to ask for a consultation with a general practitioner. If treatment is of any avail whatever in such cases, it ought to be directed by one who, better than a specialist, understands the indications and action of medicine.

In the province of diagnosis, moreover, something may be gained by the co-operation previously suggested. We all know the extreme interest now attached to the ophthalmoscopic diagnosis of cerebral tumor, of Bright's disease, of pernicious anæmia, of valvular insufficiency of the heart, of acute miliary tubercle, and so on. So long

as the general practitioner does not avail himself of the use of the ophthalmoscope, will he not, in doubtful cases, for the benefit of science, at least, ask for an ophthalmoscopic examination by the specialist? Or, if this might be deemed of doubtful propriety in the case of private patients, cannot a beginning be made in the case of free patients or hospital patients? Who knows but that, by the diagnosis of some diseases in this manner, an earlier treatment might be of benefit! The field seems broad and promising. Still, we are not to forget that the claims of some oculists in this direction may have been too demonstrative or too much exaggerated. But, even under such a condition of things, the mutual co-operation mentioned will, if carried into effect, correct extravagances and place the theory on a firm and practical basis.

Perhaps the chief, if not the only, reason why the practitioner often refuses, or rather neglects, to consult with specialists generally, lies in the fact that the latter like to see themselves in charge, and are often in the habit of taking direct possession of a case in which there are any symptoms whatever on the part of the organs of which they make a specialty. Many specialists, moreover, are entirely oblivious to the frequent participation of the organs of special sense, in inflammation or diseases of other bodily organs, and plod along contentedly, treating all their cases locally, and never looking about for symptoms indicative of constitutional affections. Both of these errors in professional ethics and the practice of their specialty are, however, the fault of medical education; for it is so easy, in many schools, to pass the final examination for a degree, and it is easier still to claim to be a specialist, especially when fortified by the reputation of having studied in one of the larger cities, even if only for a very few weeks. Now these errors can be, and we are sure that they will be, ultimately remedied by raising the standard of ethics, and, above all, of education, insisting upon more thorough examinations, preliminary as well as final, and, above all, by cutting off the supply of "private instruction," which is by no means "private," but open to all who will pay.

It is sometimes said of ophthalmologists of the day that they are narrow-minded men, who live and practice in a rut. In answer

we merely ask: How can he be narrow-minded who, in order to keep abreast with the constant advances and researches in modern ophthalmology, must have a thorough knowledge of at least one language besides his own! How can he be narrow-minded who looks understandingly, year by year, into thousands of new papers and books on the diseases of the eye and their connection with diseases of the general system! Is there not a demand upon something more than narrow-mindedness to understand the meaning of this monumental pile of literature on so many diseases, so many symptoms, and in so many different languages? He who has not looked over the mere catalogues of papers on diseases of the eye, can have no idea of the extraordinary activity in this direction. One has to read, and read incessantly, to keep along with the new ideas and practical results.

But, after all our arguments *pro* and *con*, the truest way in which to discover the mental condition of a specialist, in any branch, is to look at his methods of practice in that brilliant mirror which the great GOETHE has held up before us. It seems as if this far-seeing spirit has some men of our own days in his mind, when he prophetically says: "For the narrow mind, whatever he undertakes is always a trade; for the higher, an art; while the highest—in the one thing which he does rightly, sees the likeness of all that is done rightly."

Thus have we sketched the history of ophthalmology from ancient times to our own, seen some of its more notable representatives in the past, appreciated, on the whole, a steady advance from century to century, and, in the last thirty years, a huge dead-lift out of the ruts and superstitions of the dark ages. If we have lingered perhaps too long over the picturesque accounts, which history has handed down to us, of quacks and hypocrites in our specialty, it has been simply to show how they cheated the people and the profession and degraded the specialty, just as we may see some men doing in our own days. As CARLYLE says, "The bad is only worth describing, lest it be mistaken for the good."

The specialty of ophthalmology is fast becoming crowded and even over-crowded. From this condition, several evils are sure to result. The greater the rush to the practice of this specialty, on

the part of men who look only at the money that there is in it, the greater will be the danger to the people who put themselves under the care of such men. The more numerous the specialists, the greater the necessity for the general practitioner to look carefully at the merits of those with whom he comes in contact, or from whom he receives written solicitations for patients. His first duty in this respect is to ask himself upon what education and what merits this or that one pretends to a right to practice a specialty which relates to the noblest organ of the human race. For the mere fact that any one claims to be a specialist in the diseases of any organ does by no means prove that he knows anything at all of the organ in question. It may be easy, by loud protestations of skill, to defraud the people, but it should never be easy—it should always be impossible—to mislead the general practitioner. We are not of those who fear ophthalmogy will ever become so degraded as it was, not so many centuries ago, for we think that the education of the people is slowly reaching a higher grade; we are sure that there is the same tendency in the study of medicine. Therefore, these two causes combined will have a mighty influence in upholding the specialty at its present lofty stand-point, both in a social as well as in a scientific point of view. Here, then, ends our task to which we have given long hours and multitudinous thoughts. Well have we weighed each word, for the simple truth has been our aim. If we have, for an instant, stepped beyond, it has been only that we were weaker than our task. But if we test our feelings by the touching words, "To be weaker than our task is the true misery," then we have simply reached the truth at which we aimed. For cheerfully, and even happily, have these long historical records been overhauled, these thoughts of ours developed and arranged. So, cheerfully and happily, and thankfully to all, we say our farewell.